Day 1 overview

- SSH keys and logging into the AWS
- Basic Bash/Intro to Git
- Vim and Vimtutor
- Review library prep and sequencing

Logging into the supercomputer

- Open and follow the worksheet **SSH_AWS**

(https://github.com/Dowell-Lab/srworkshop/tree/main/day01/worksheets/SSH_AWS.md)

- You MUST
    1. Be logged into your GitHub account
    2. Have a terminal application open (see worksheet for details)

- After finishing the worksheet, try to log into the AWS:

```
ssh <github_username>@13.58.16.233
```

**replace <github_username>, including brackets, with your username

If you need help, flag us with a red sticky note

If you are successfully logged in, put up a green sticky note

Basic Bash and Git/GitHub

- Open and follow the worksheet **Git_github_bash**

(https://github.com/Dowell-Lab/srworkshop/tree/main/day01/worksheets/Git_github_bash.md)

- This worksheet orients you to the class GitHub repository and gets you started with some basic Bash navigation
- Main commands:

`pwd`	Print working (current) directory
`cd`	Change directory
`ls`	List contents

If you need help, flag us with a red sticky note

If you are done, put up a green sticky note

Break

If you do not have a working terminal,

please log into Google Shell now

(.../srworkshop/day01/worksheets/Google_shell.md)

Vim and Vimtutor

- What is Vim?
  - Text editor – read, write, and save text files
  - Entirely keyboard-based
  - You CANNOT use your mouse to move the cursor!!!
- Vimtutor is on every Unix/Linux system and teaches you how to use Vim
- Open and follow the worksheet **Vimtutor_crashes_colors**

  (.../srworkshop/day01/worksheets/Vimtutor_crashes_colors.md)

If you need help, flag us with a red sticky note

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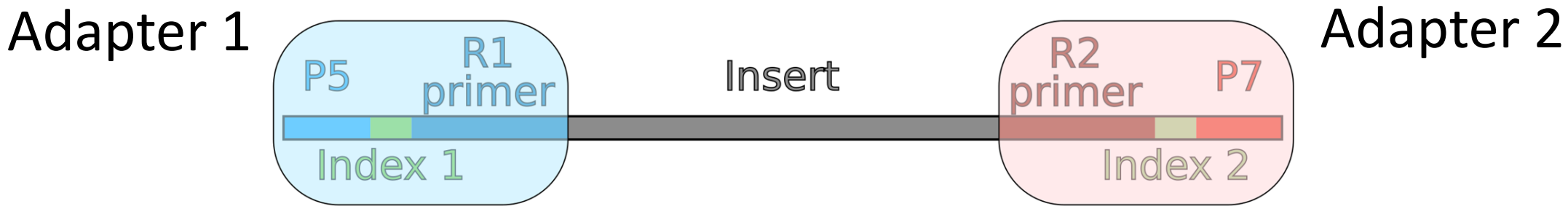
Homework for day 2

- Videos for day 1 (if not already done)
- Videos for day 2
- Vimtutor
  - Lessons 1 and 2
  - Advanced students should do lessons 3-5
- Day1_homework (library QC challenge)

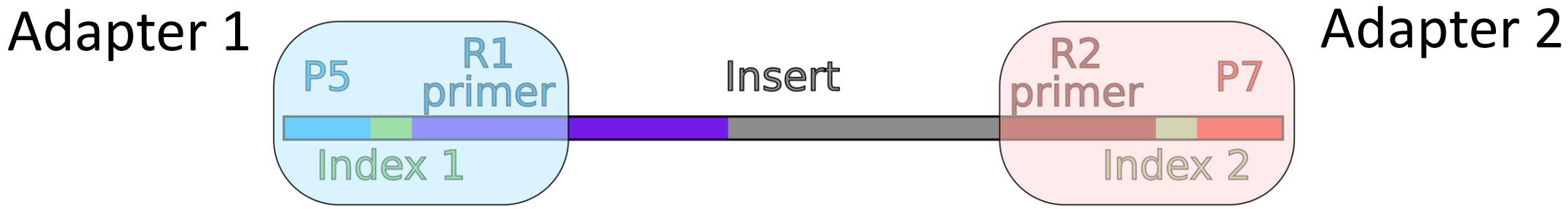
Library prep and sequencing

Anatomy of a library



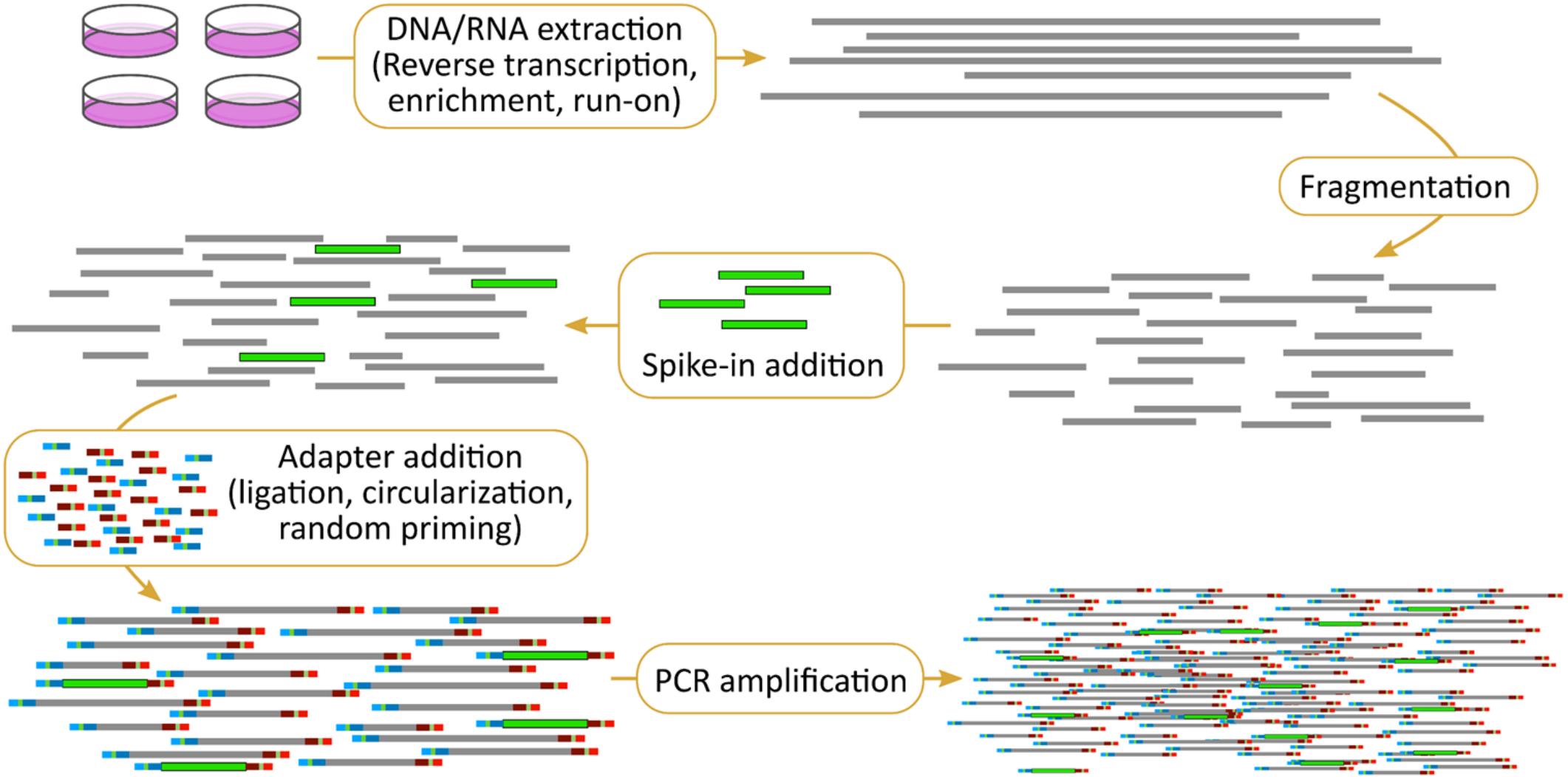
P5/P7	Ends that attach to flow cell
Index 1/2	ID sequences for multiplexing samples
R1/R2 primers	Sequencing primers
Insert	Fragment of sample DNA/cDNA

Anatomy of a library



P5/P7	Ends that attach to flow cell
Index 1/2	ID sequences for multiplexing samples
R1/R2 primers	Sequencing primers
Insert	Fragment of sample DNA/cDNA
Read	Sequenced portion of fragment

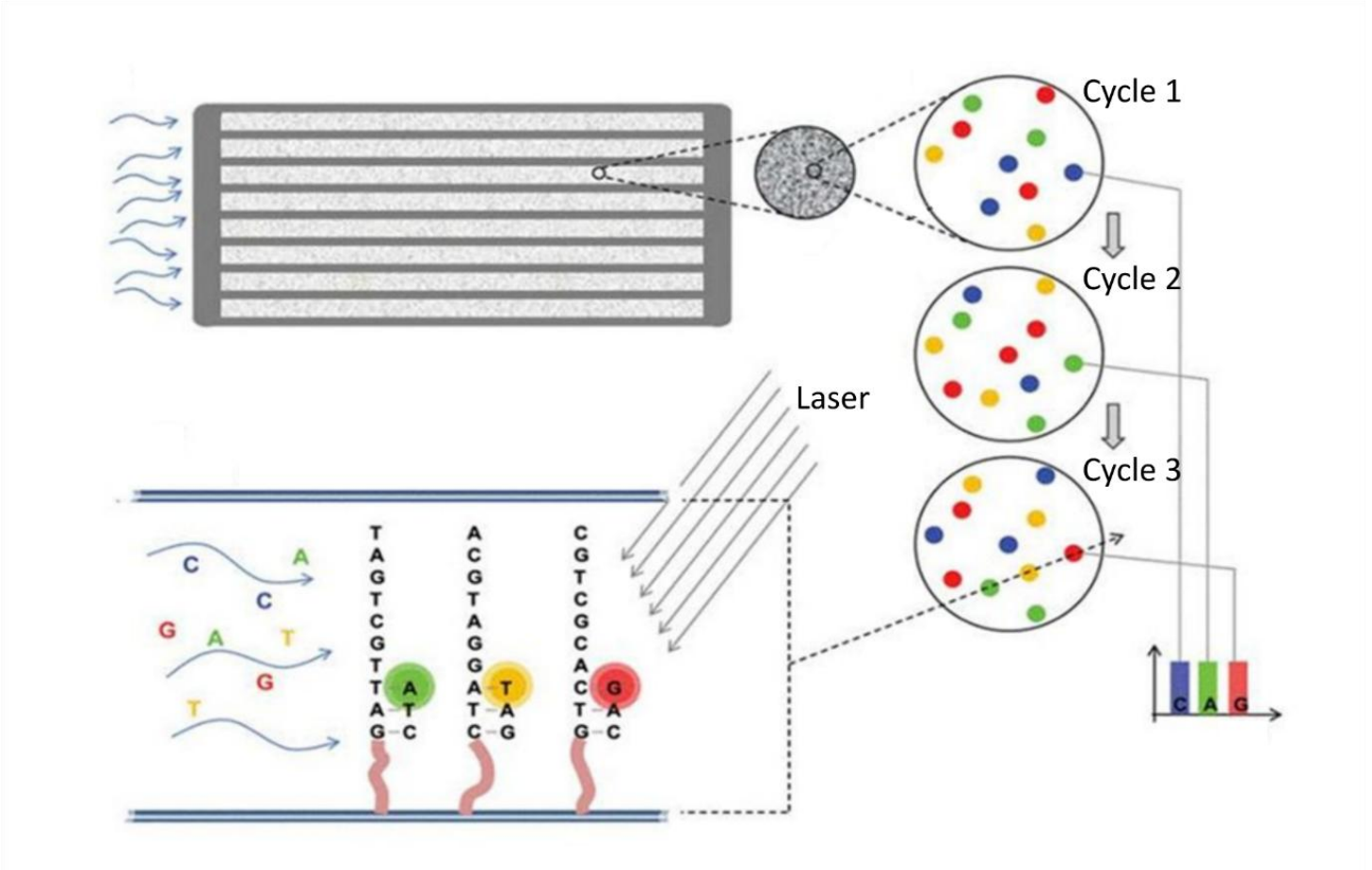
Creating libraries



Illumina sequencing technology

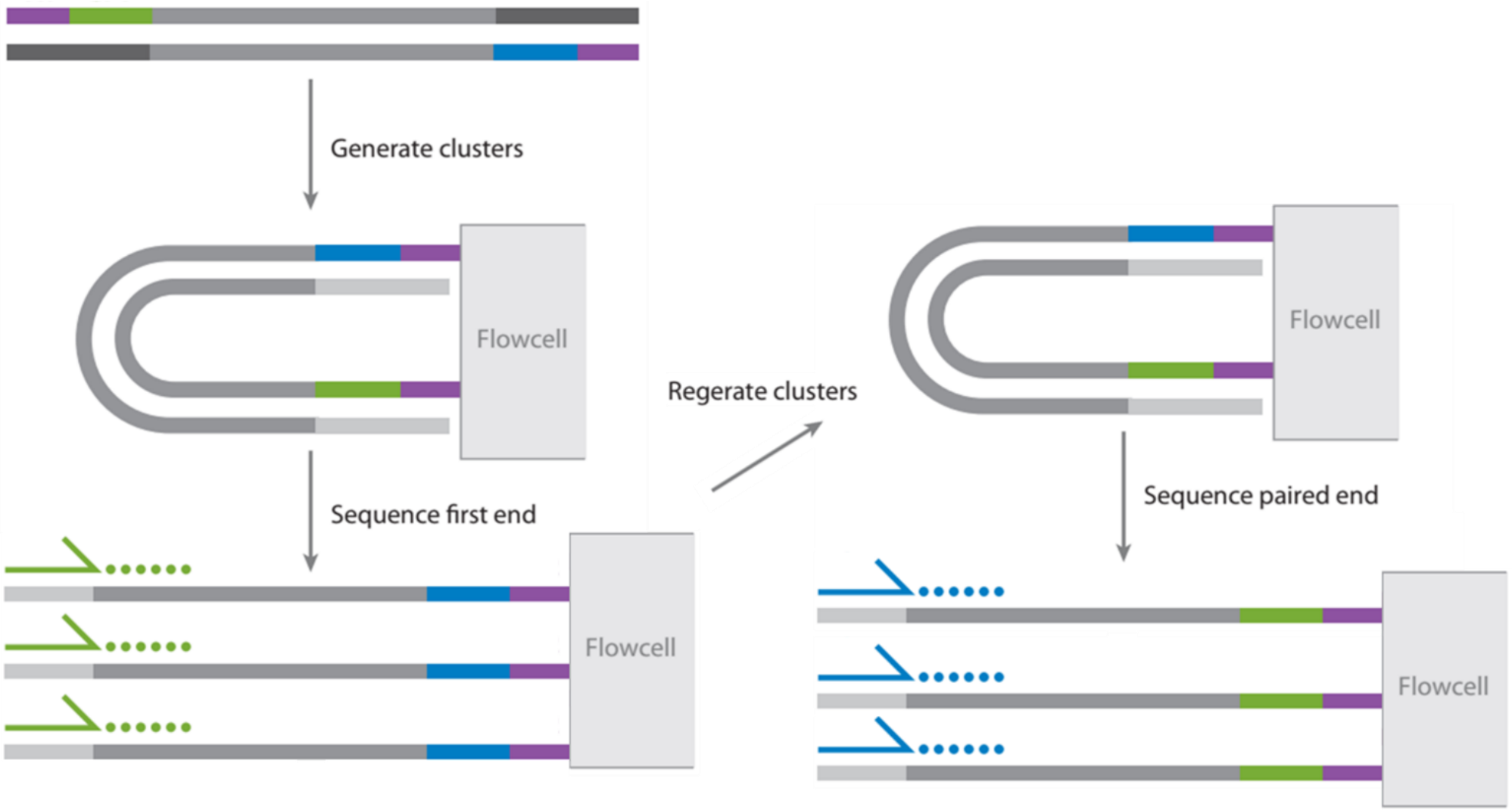
Imaging a slide (flow cell) with millions/billions of DNA clusters by cycling in fluorescent nucleotides

Sequencing:



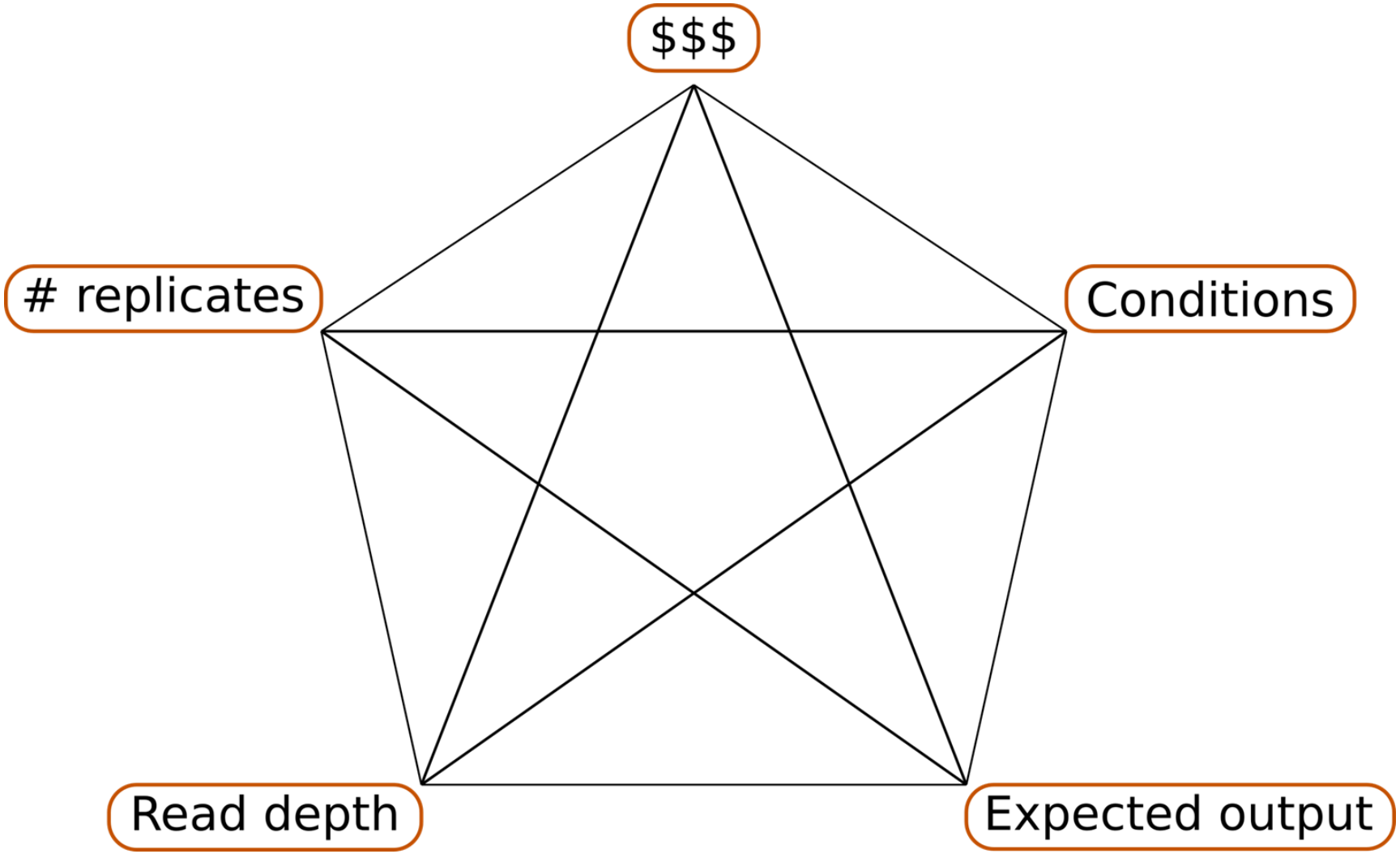
http://tucf-genomics.tufts.edu/home/ordering

Single/paired end sequencing



Mardis. https://doi.org/10.1146/annurev-anchem-062012-092628

Designing a sequencing experiment

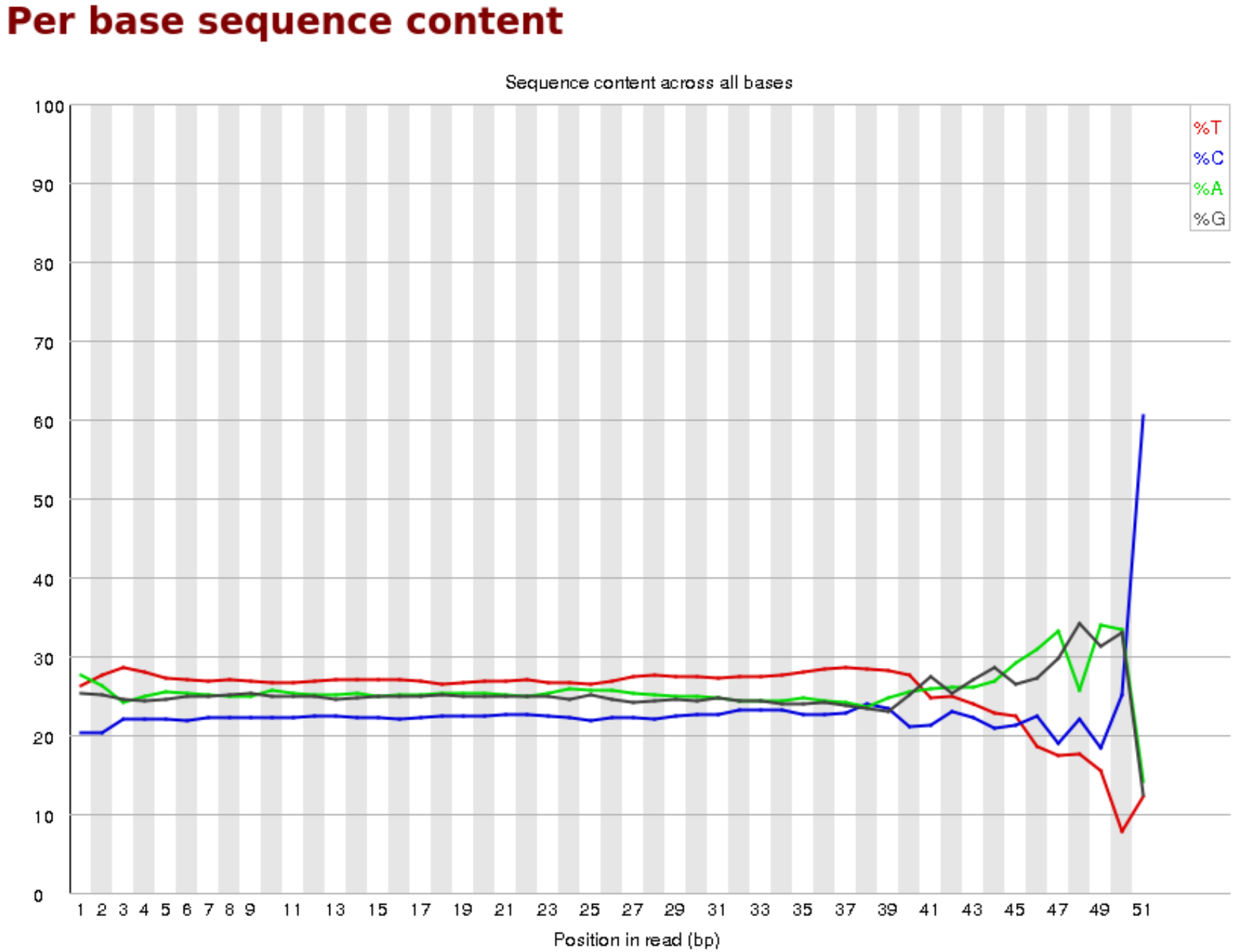


Library QC

FastQC

Base diversity

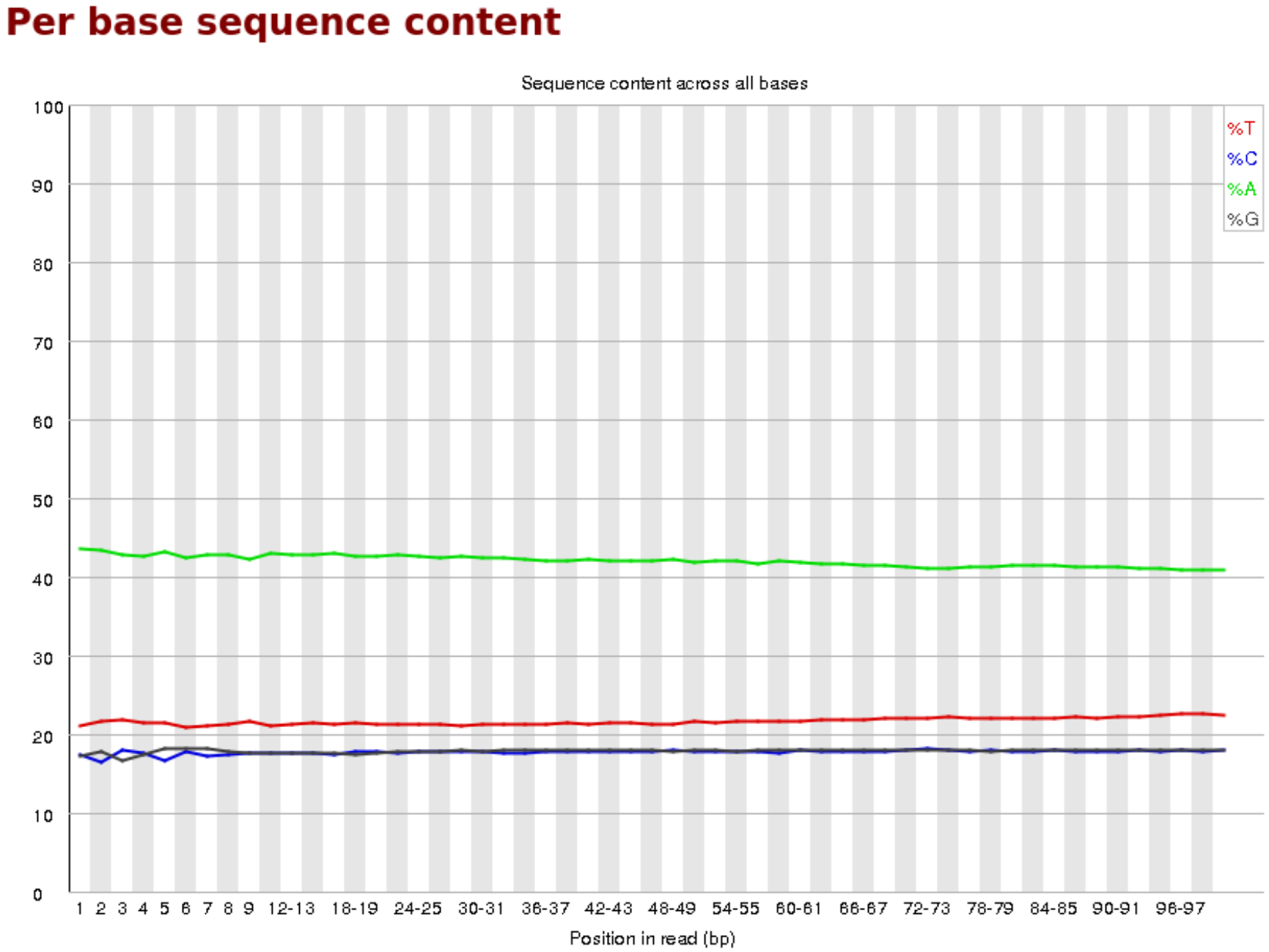
Complexity



FastQC

Base diversity

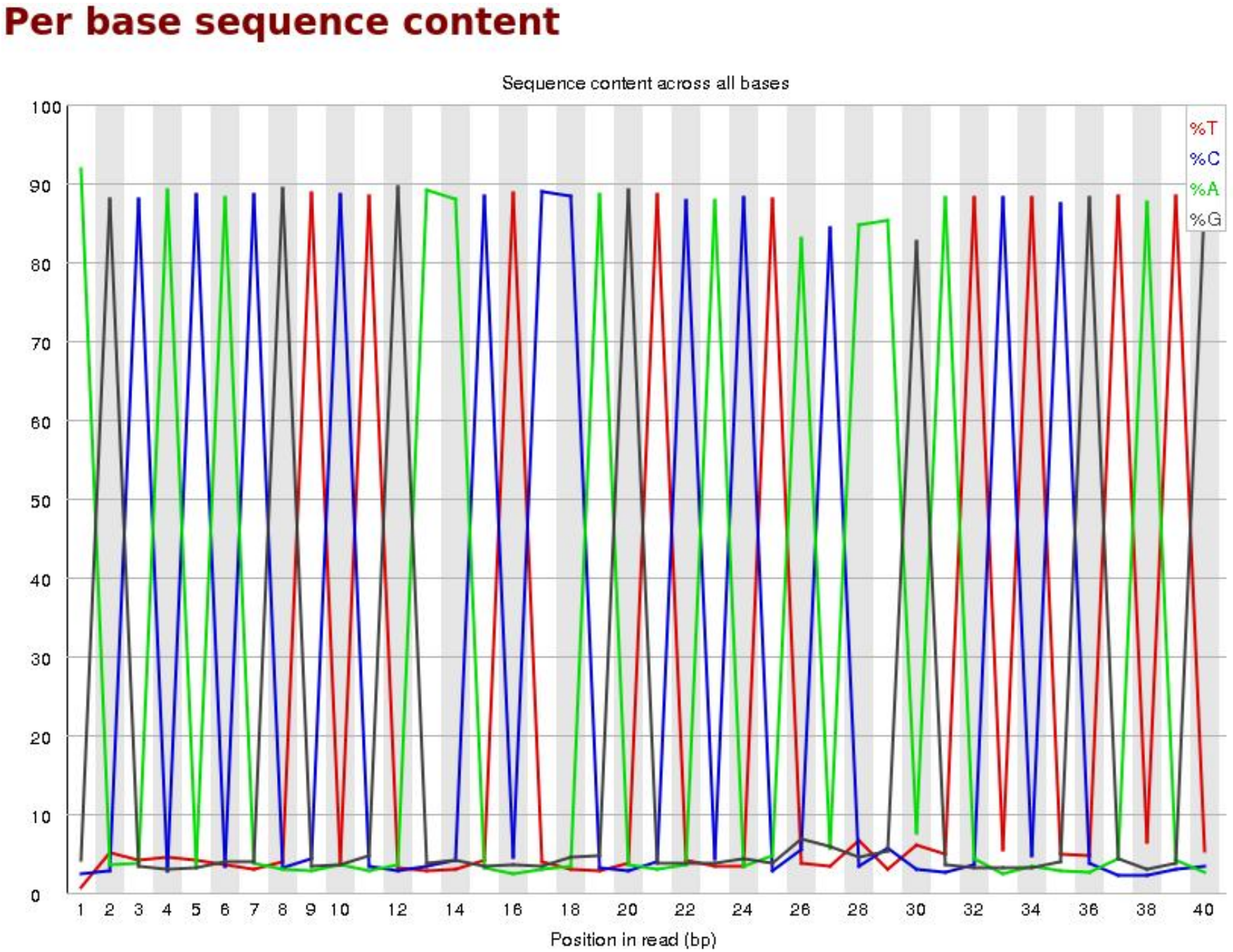
Complexity



FastQC

Base diversity

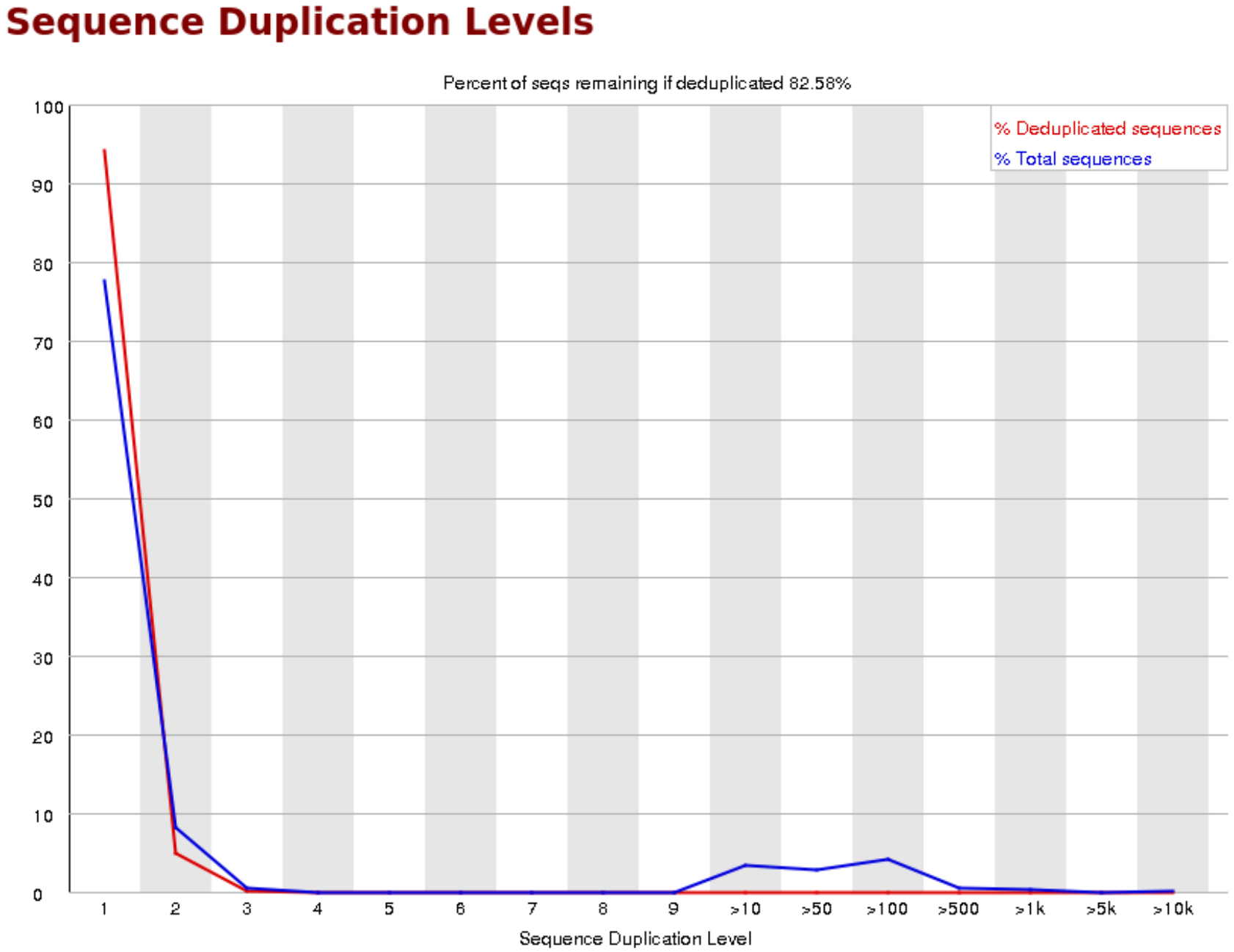
Complexity



FastQC

Complexity

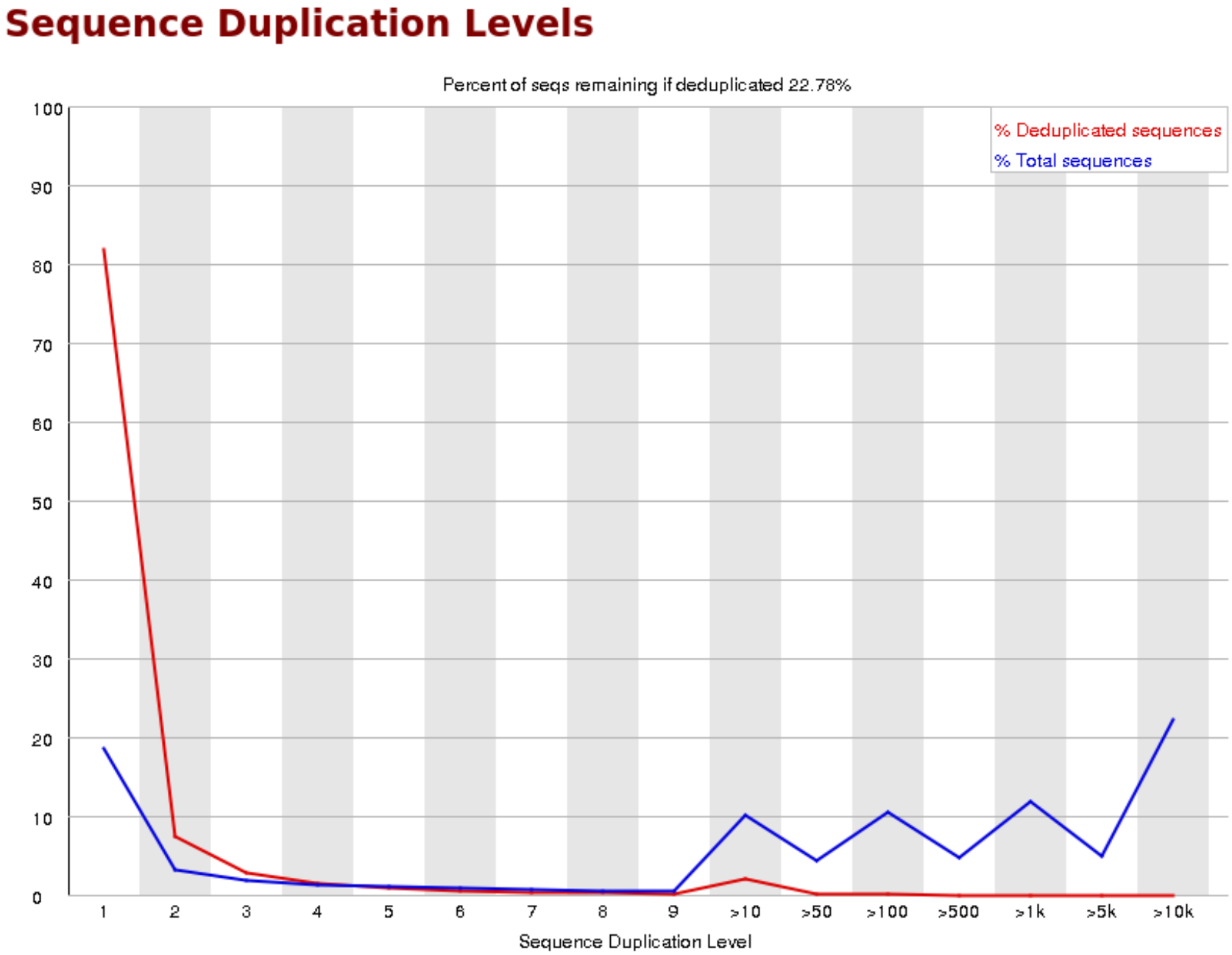
Duplication



FastQC

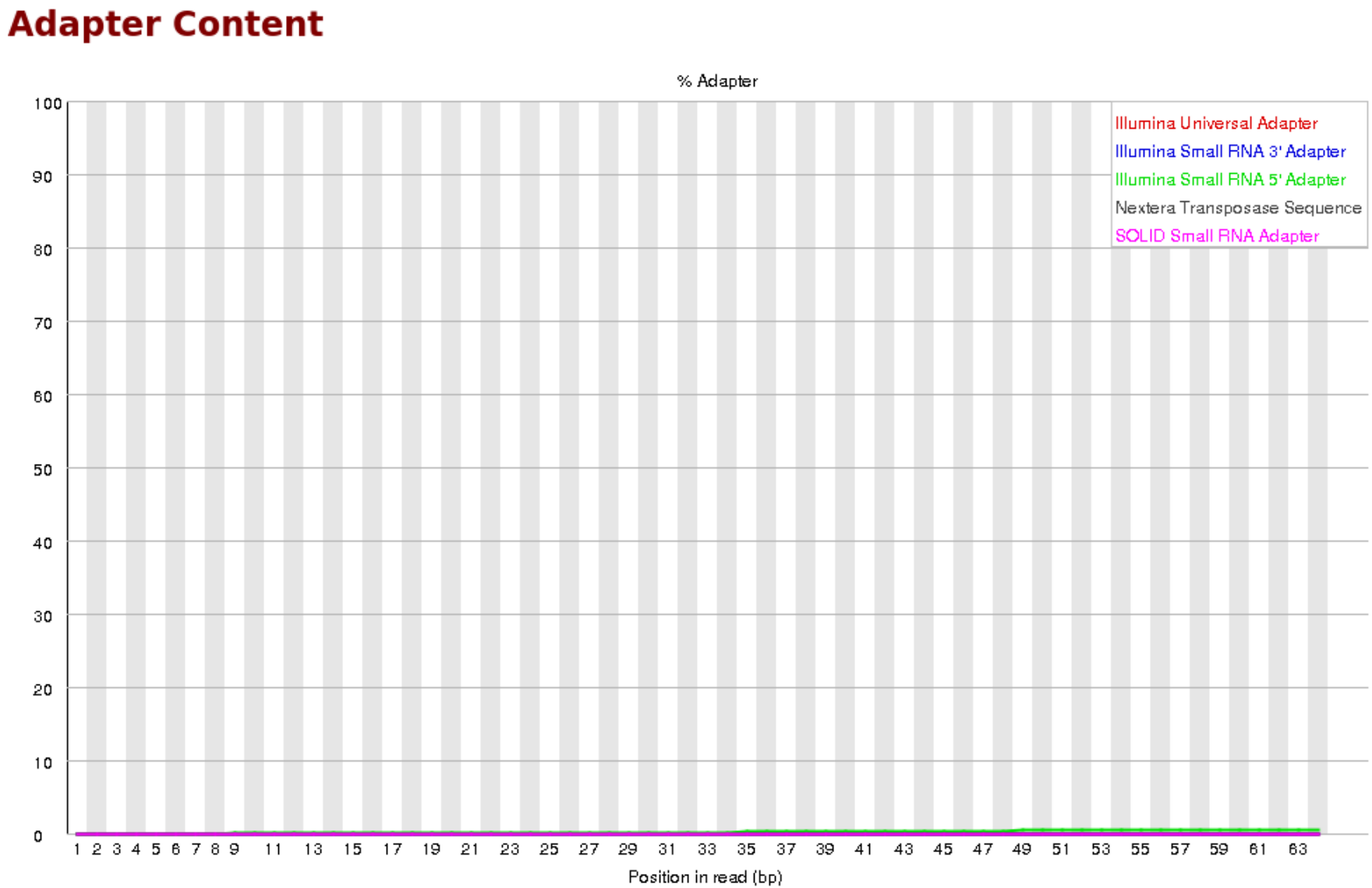
Complexity

Duplication



FastQC

Adapter Contamination



FastQC

Adapter Contamination